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BOARD OF PUBLIC HEALTH, VICTORIA.

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# REPORT

ON



# MEANS OF ISOLATION IN VICTORIA,

BY

DR. GRESSWELL.

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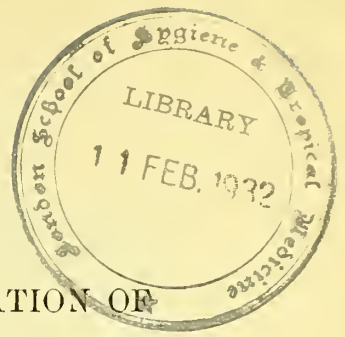
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## REPORT BY DR. GRESSWELL ON THE MEANS FOR ISOLATION OF INFECTIOUS PERSONS IN VICTORIA.

In a report on Melbourne, presented to the Board in October, 1890, I dwelt upon the want of means for isolating infectious persons in the metropolis; frequently, too, I have invited attention to the same want in other parts of the colony; and, as regards exotic disease, the inefficiency of the appliances for Port Quarantine, and the inadequacy of the accommodation for meeting more than the most limited requirements of Inland Quarantine, have formed the subject-matter of a considerable number of my reports. Such action as the Board are empowered to take in reference to these matters has been taken—by way of representations to the Honorable the Minister of Health, and to the local councils of the colony, as also in regard to typhoid fever by the extreme measure of making an Order in the case of the metropolis for the provision of the necessary accommodation.

It may be well now to review the general position of the colony in respect to the means for isolation. Seeing, however, that, in several recent reports, I have referred to the defects in the sanitary equipment of the State against exotic disease, it will not be necessary to give consideration to those defects here; and this Report will, accordingly, be devoted in the main to questions concerning local equipment of Municipal Councils against infectious diseases.

In dealing with this subject, I shall quote largely from my reports, prepared at different times on various questions relating to isolation, to disinfection, and to construction of fever-hospitals. The reports, here referred to, are as follow:—

“On the Sanitary Condition and Sanitary Administration of Melbourne and Suburbs.”—October, 1890.

“On the Means for Isolation of Persons Affected with Communicable Diseases in the Metropolitan District.”—November, 1891.

“On the Charitable Institutions of Melbourne.”—November, 1893.

For purposes of this Report, the subject-matter will be ranged under the following headings:—

- I.—General History of the action taken in Victoria to provide means for isolation.
- II.—Isolation in its general aspects.
- III.—Isolation in other countries.
- IV.—Some principles as to the locating, constructing and planning of isolation-hospitals.
- V.—Isolation in the metropolitan district.
  - A.—Extent of communicable diseases, and of means provided for isolation of them, in the metropolis.
  - B.—Effect of non-isolation on epidemic prevalences in the metropolis.
  - C.—Reason for abstention from hospital on the part of the infectious sick of the metropolis.
  - D.—Present condition as to isolation in the metropolis.
  - E.—Isolation-requirements of the metropolis.
  - F.—Location of isolation-accommodation for the metropolis.
  - G.—Materials for construction of an isolation-hospital for the metropolis.
  - H.—Constitution of board of management, and source of funds, for providing and maintaining isolation-accommodation for the metropolis.
- VI.—Isolation in extra-metropolitan districts.

### I.—GENERAL HISTORY OF ACTION TAKEN IN VICTORIA TO PROVIDE MEANS FOR ISOLATION.

In my Melbourne report of 1890 I made the following statement:—“In order that sanitary authorities may be in a position for coping with communicable disease, it is necessary that they be provided with information as early as practicable of the occurrence of such disease in and about their districts; that they be provided with



means for isolating persons suffering from such disease, and with power to cause the isolation or destruction of animals, and the destruction of the produce of animals, when affected with disease communicable to man; and that they have means for efficiently disinfecting infected dwellings as well as infected articles of bedding, of clothing, and the like, together with means for rendering innocuous the discharges from persons affected with communicable disease." I pointed out also the weaknesses in the system of notification of infectious disease, the absence of provision for isolation of persons affected with such disease, and the want of efficient means for the disinfection of bedding and clothing in the metropolis. At the same time, I drew attention to the fact that isolation and disinfection could not be properly carried out in any part of the colony.

With the view of bringing these and other matters under the notice of the Local Authorities, the above-mentioned report was distributed by the Board to the Municipal Councils of the colony; while a circular letter was addressed in November, 1890, to the Metropolitan Councils, urging that a conference be held, to consider what steps should be taken in order to provide means for dealing with infectious disease.

The replies, received from the Metropolitan Councils to the circular letter, seemed to show\* doubt on the part of some councils as to the need for isolation-accommodation, and an impression that the general hospitals, such as the Alfred and the Homœopathic, might be used for isolation-purposes. A conference of Metropolitan Councils was, nevertheless, held in March, 1891; and a committee, appointed by the Conference, interviewed the Board as to the cost of building and maintaining an isolation-hospital. In accordance with a promise then made, I reported more fully on the whole subject in November of the same year; and Mr. Le Capelain, at the time the Engineering Inspector to the Board, gave a detailed estimate (*vide* Appendix A) of the cost of the several buildings and appliances specified in my report as being required for the metropolis. In January, 1893, the Conference informed the Board that the providing of an institution, of the kind mentioned in my report, could not at that time be undertaken, "owing to the great expenditure" involved; and they asked for information as to the cost of erecting two iron hospitals each of four wards, and each for two different infections, each of the wards of the one hospital to accommodate five patients, and each of the wards of the other, ten. This information, which I accordingly prepared (*vide* Appendix B), was placed in the hands of the Conference in September, 1893.

Nothing, however, of a practical nature was done until June, 1896, when scarlet fever again assumed a considerable prevalence. On the 5th of that month, the Honorable the Premier—after I had given, at his request, the views of the Board on the advisability of establishing a fever hospital for the metropolis, a question which had been brought under his notice by Lady Clarke—promised to provide £2,500, on condition that an equal sum were subscribed by the public, and £1,000 by the Municipal Councils.

I then obtained the opinions of the three medical societies of Victoria—societies representing, it may be said, the entire medical profession of the colony—on the question as to the need of a fever-hospital for the metropolis. These opinions were given in the following resolutions, viz.:—

Victorian Branch of the British Medical Association, 10th June, 1896.—"That, in the opinion of the Victorian Branch of the British Medical Association, the want of hospital-accommodation in the metropolis, for affording medical relief and isolation to persons when suffering from infectious diseases, constitutes a grave reflection on the local sanitary administrations, necessitating, as it does, the infliction of a vast amount of wholly unnecessary suffering and fatality upon the community; and that it demands an appeal from the medical profession and from individual citizens direct to the Government, or, in the event of this being unsuccessful, an appeal to all who have a sense of charity, with the view of an institution being at once established for the purposes above mentioned."

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\* The Melbourne City Council wrote, stating that it had been prepared, if necessity had arisen, to continue the arrangements previously made with the managers of the Alfred Hospital, but that such necessity had not arisen; also that it was doubtful how far it would have arisen previously, if the managers had not appropriated a portion of that hospital to the accommodation of paying patients instead of the poor, for whom the institution had been founded. The Heidelberg Council were of opinion that sufficient accommodation had been provided in the district. The Kew Council saw no necessity for taking any steps in the matter. The Collingwood Council stated that, during the previous season, only eight cases necessitating removal to hospital had occurred; and that these, in accordance with previous arrangements with the managers, had been treated in the Homœopathic Hospital. The Richmond Council said that it was a matter for the Government, and not for the Metropolitan Councils, to undertake.

Melbourne Medical Association, 11th June, 1896.—“That, in the opinion of this association, it is urgently desirable that a special hospital for the treatment and isolation of persons suffering from infectious diseases should be established without delay; that, in order to afford medical relief to persons who may suffer from scarlet fever during the present epidemic, some temporary accommodation should be immediately obtained; and that an appeal be made to the municipal authorities, or, if necessary, to the Government, to urge the necessity of carrying out these reforms.”

Medical Society of Victoria, 12th June, 1896.—“The providing of means for isolation and treatment of persons suffering from infectious disease is, for the metropolis of Melbourne, an urgent want, imperatively demanding the consideration of the community, the absence of such accommodation being at all times a source of great hardship, and, during outbreaks of infectious disease, a cause of widespread suffering and danger.”

In the same month, the Board again urged the question upon the consideration of the metropolitan councils. Most of the councils replied that they were acting in concert with the view of making the needed provision; but some still hesitated to take any action—the Hawthorn Council, for instance, stating that they had resolved, and the Coburg Council that, for the time being, they also had resolved, to do nothing in the matter.

In the following November, I again drew the attention of the Board to cases of severe hardship inflicted on poor families as a result of the want of means for isolation—hardships which, though for downright barbarism difficult to match, were of frequent occurrence in the metropolitan area.

Then, in order that the matter might be again considered, the Mayor of Melbourne convened, in January, 1897, a Metropolitan Municipal Conference; and, in the following March, he called a public meeting, at which it was resolved—

“That a fund be instituted for the purpose of erecting an infectious diseases hospital as a permanent memorial in Her Majesty’s honour, and in commemoration of her long and beneficent reign, such hospital to be called the Queen’s Memorial Hospital; and that an appeal be made to all classes of the community to join in making such memorial worthy of the event to be commemorated.”

A fund having been accumulated of over £16,000, an executive committee was formed in November of the same year for carrying out the work; and means for isolation in the metropolis, though limited in extent, will no doubt shortly be provided.

Turning now to the extra-metropolitan districts, it is to be noted that, while for several of them some means for isolation have been provided, for the great majority of them no such provision has been made. As regards the former, the following particulars may be mentioned. In September, 1893, a small permanent two-warded hospital for isolation-purposes was erected jointly by the councils of Daylesford, Mount Franklin, and Glenlyon; though, owing to the proximity of the building to the general hospital, it cannot be used for infectious cases. In October, 1894, the managers of the Hamilton General Hospital desired to erect two isolation-wards on the grounds of their hospital; and, later, on my advice, they built them on an entirely independent site. The managers of the Castlemaine General Hospital, also, have provided accommodation for a few infectious patients. Similar provision is now being made on the grounds of the Warrnambool General Hospital; and funds have been collected for a like purpose at Wangaratta, Colac, Maryborough, and Stawell. There is, accordingly, promise of considerable increase of isolation-accommodation for districts outside the metropolis.

## II.—ISOLATION IN ITS GENERAL ASPECTS.

*The purpose to be had in view, in making provision of the kind here referred to, is twofold—first, to defend the health of the community; and, secondly, to afford medical aid to the individual sufferer.* The well-being of the community as a whole is, of course, the subject of main concern to a sanitary authority. But in the matter under consideration, as generally in matters of public health, if the well-being of the community is provided for, that of the individual also is in large part protected; so that the twofold purpose, above spoken of, cannot in practice be dissociated. It may not, however, be irrelevant in this place to remark that persons, especially those in poor circumstances, are generally in much greater need of medical attendance and good nursing when affected with communicable disease, than when affected with disease of a non-communicable character; so that, if there is reason for establishing institutions devoted to the treatment of persons in poor circumstances when suffering from non-communicable affections, there is reason far greater in weight for establishing institutions for such persons when suffering from affections that are communicable. Still,



though relief to the individual is necessarily involved, the object specially to be aimed at by a sanitary authority is the defence of the healthy against infection from the sick—the prevention of transmission of disease from one individual to another, whether direct by so-called personal infection, or indirect by discharges of the persons affected.

There are, it is true, advocates for the principle that infection-diseases should be allowed to take their own course. It has, for instance, been argued that no artificial hindrance should be put in the way of *the survival of the fittest*—a contention in this connexion so empty as to be unworthy of mention. It has, again, been stated that no one can escape the several infections, and that it is better to *get over* them early than later in life; but some of these infections are preventible, typhoid fever for instance being in chief part, if not altogether, of this nature. Moreover, it has not yet been shown that, even when an epidemic is mild, it is in the interest of the individual, the local community, or the State at large, that infection be courted. Circumstances may, perhaps, arise when such a procedure would be safe—possibly expedient. But: expediency in this matter could not be predicted—either for the individual, seeing that age, constitution, and other conditions are concerned in determining the resultant influence of infection, or for the community, seeing that an outbreak of infection-disease unfettered in its course may become increasingly severe in its manifestations before its prevalence commences to abate. It should, too, be added that, though a child may take no harm from an infection such as that of typhus fever, there is complete ignorance as to the part which the bodies of children so infected, though reacting in no marked manner, play in influencing the severity of the virus when transferred to a person of greater age. Moreover, in the majority of instances, in which an epidemic is so mild in character as to suggest the expediency of exposure to infection, the question of isolation is not so much as entertained. Under such conditions, too, let the isolation-accommodation be never so magnificent, notification of communicable disease never so complete, enactments as to isolation never so stringent—the epidemic, while still mild in its manifestations, will run its course; no law can be devised or executed to check its progress by means of isolation. If, again, the child would take and pass through the several infections without harm, all might be well under a system of universal exposure to the various infections; but it is not so. The fatality of scarlet fever, for instance, is much higher in early childhood than in later life—infants, in whom this and certain other infections are generally scarcely recognisable, being of course excepted. In the case of diphtheria it is the same; and, in addition, there is the fact that one attack of this disease, so far from conferring immunity, frequently leaves the individual more liable to contract the same infection afresh. As regards scarlet fever, measles, and diphtheria, it has been contended that the general mildness of attack in later life is the result of partial immunity acquired by infection in early life; but it cannot be said that this contention rests upon a basis of known fact sufficient to justify a policy of non-isolation for persons affected with these disorders.

It thus seems that, whereas in cases, in which the argument against isolation may be worth anything, isolation is not even contemplated, and certainly cannot be enforced; in other cases, which are only too numerous, the argument is readily refuted. *In fact, the advisability of isolating persons affected with communicable disease must be admitted, no matter from what aspect the question is considered.*

*It will, of course, be understood that, though isolation of the early cases may, and often does, put in abeyance the primary cause of an outbreak, it does not do so in all instances.* The primary cause, for instance, of an outbreak of typhoid fever may be specific pollution of water or of milk, so that in either of these instances isolation could have no direct influence in checking its operation. Again, as regards scarlet fever, reference need but be made to the researches of Power and Klein concerning the transmissibility of it to man by the milk of cows constitutionally affected with what thus appears to be the same disease, or to the statements made concerning the relation of outbreaks of this disease to disturbance of bodies of persons that have died of it—in order to show that isolation may be by no means the only precaution required in combating a scarlatinal epidemic. Further illustrations might readily be adduced, but these must suffice. *It will, then, be evident that isolation, though accepted as a necessary measure, constitutes for some, if not for a large proportion of, outbreaks only one factor in the means of sanitary defence, removal of the infectious sick in such cases being the removal of secondary centres of infection; and*

it may, in passing, be added that such removal affords special facilities for searching more thoroughly into, and so for eradicating, the condition primarily operative in the causation of the outbreak.

It may perhaps be asked whether, as a preliminary measure, it would not be sufficient by means of a fever-hospital to provide merely for the medical relief of the infectious sick, without regard to the wider function of affording protection to the community against infection; whether, indeed, the management of an infectious diseases hospital might not be undertaken with the conditions of admission and discharge the same as those that apply at a general hospital in regard to cases presenting no element of infectivity. This is a question which may in some communities perhaps receive an affirmative answer, for it must be granted that even home medical relief of itself, especially in regard to diphtheria, is a measure of no inconsiderable value. It is, however, to be borne in mind that measures, such as those now under consideration, cannot be accepted as sufficient safeguard for a community against infection, or as sufficiently realizing the views held now-a-days in those countries where attention is directed to the conservation of the public health.

### III.—ISOLATION IN OTHER COUNTRIES.

From almost the earliest times, of which we have record, isolation for communicable diseases has been regarded as an expedient essential to the well-being of communities. The means provided for isolating persons afflicted with leprosy, with plague, or with small-pox, are well known. In addition, however, to these affections, there are others for which isolation-provision has long been regarded as an essential part of the equipment of a Sanitary Authority. Indeed, for many years past the Metropolitan Asylums Board of London have isolated cases of scarlet fever, typhus fever, typhoid fever, diphtheria, and small-pox; while the Corporation of Glasgow have isolated cases of scarlet fever, typhus fever, typhoid fever, small-pox, measles, whooping-cough, chicken-pox, puerperal fever, and erysipelas.

In England, as elsewhere, the recognition of the advisability of providing means of isolation for these several diseases has been a matter of slow but steady development, materially quickened, however, by the issue, in 1882, of the classic monograph by Dr. (now Sir) Richard Thorne, on the "Use and Influence of Hospitals for Infectious Diseases" in England and Wales.

For many years past, the Boards of Guardians in England have been charged with the duty of providing for the *infectious poor*, while Local Sanitary Authorities have been empowered to provide for infectious persons in general whether poor or not. And it is of special interest to observe that practical experience of this system of dual local control has taught the advisability of only one local authority undertaking for one community the isolation of all and sundry when in an infectious condition.

In London, for example, the Metropolitan Asylums Board, though constituted in the first instance for the purpose of providing isolation for the *infectious poor*, is fast becoming the only authority for isolating infectious illness in the different classes of the London population; while in the rest of England the Local Sanitary Authorities are taking over this extensive function—special hospitals for the infectious sick, special ambulances, and special disinfecting chambers, having been extensively introduced by them for the purpose. So far, indeed, has this proceeded that the wards used for isolation in past years at many general hospitals in England, more particularly in London, have in considerable proportion been devoted to other uses, since the necessity for more complete isolation was established, and the advantages attaching to undivided administration in carrying out such isolation for one and the same community have come more and more to be appreciated.

The history of isolation has also taught that, as it is necessary to maintain isolation between infectious disease on the one hand and non-infectious disease on the other, so also is it necessary to maintain isolation between different infections. For this purpose, the wards devoted to different diseases need to be isolated; and, in the administration, everything needs to be so arranged as to render the isolation as complete as practicable.

It may be asked, if isolation can be maintained in an infectious diseases hospital between different classes of infectious disease, why not also in a general hospital? No doubt, if all the precautions observed in the former be observed in the latter, not excluding those relating to construction, it can be maintained. But, in proportion to the degree of isolation obtained, so will be the measure of success achieved; and it



will be idle to contend that there is as much likelihood of the necessary isolation being observed at a general hospital, into which persons suffering from all sorts of ailments, whether communicable or not, are admitted, as at an infectious diseases hospital which has been built specially for the purpose, into which only certain kinds of cases are admitted, and in which every official is daily receiving education in the practice of isolation. The observance of the necessary precautions in the latter case is onerous enough, and the feasibility of such observance in the former case is open to question. Certainly, on the continent of Europe isolation-pavilions have within recent years been erected on the grounds of general hospitals; but it is not intended to deal with epidemics by means of these pavilions, and it is doubtful whether, even as regards the limited purpose for which they are to be used, they can be recommended for imitation. In this connexion, too, full weight must be given to the conclusions which naturally follow from Power's observations concerning aerial transmissibility of the material agent of small-pox. Moreover, if the emergencies of epidemics are to be met, provision must be made for large numbers of patients at times which, in the present state of knowledge, cannot be known beforehand, infection-diseases having their times of special prevalence and their recurrences at intervals, it may be, even of years; whereas the accommodation required in general hospitals for any given community, and for any given set of local conditions, may be much more accurately measured. In other words, the infectious diseases hospital should have a large potential accommodative capacity; and, if general hospitals are to be retained as near as practicable to centres of population, it is not likely that such accommodative capacity will be provided as will be frequently required if epidemics are to be dealt with on their grounds.

Other lessons derived from English experiences may now be mentioned. *First*, there is the importance of having everything in readiness beforehand for carrying out isolation. As urged by the Medical Department of the Local Government Board, and as forcibly illustrated by Dr. Thorne's inquiry in 1882: "*It is,*" in the words of Sir George Buchanan, "*a condition of the highest degree of importance for the usefulness of these institutions*"—isolation hospitals—"that their accommodation shall be ready beforehand." Of the hospital hastily run up when small-pox or fever is making headway in a district, Sir Richard Thorne has said: "*It is often not ready for occupation until the immediate cause of its erection has passed by; it provides accommodation of a very indifferent sort; it fails, almost without exception, to meet the permanent requirements of the district, even when in amount it turns out to be more than the district needs; and thus the object of the hospital, as a part of the sanitary defences of the district, is often attained in a very imperfect manner, and at a needlessly large cost.*" *Secondly*, as to compulsory isolation. It has been mentioned above that no matter how perfect be the means for isolating communicable disease, it can never be so perfect as to affect an appreciable proportion of mild cases of such disease. Nay more, isolation cannot even generally be carried out by compulsion. There are, moreover, instances in which home-appointments and collateral circumstances are of such a kind that home-isolation may be adopted with as much likelihood of preventing extension of communicable disease as there would be in the case of isolation in hospital. And when it is not so, when for instance such disease occurs in persons living in small overcrowded and ill-ventilated dwellings, it needs but short experience of the advantages of well-managed hospital-isolation to foster in persons so circumstanced the desire to avail themselves of it. That such experience does quickly bring about this result is evidenced by the returns furnished from those communities for which isolation-provision has been made. *Education is, in fact, a far more potent factor than compulsion in bringing about the isolation required in the defence of the community against communicable disease.* When Sir Richard Thorne made his extensive inquiry into the use and influence of hospitals for infectious diseases in England and Wales, he found that in the 296 sanitary districts, for which arrangements had then been made for isolating infectious persons, not more than three dozen instances had occurred in which resort had been had to compulsion, though thousands of patients in those districts had no doubt been isolated. And as regards the case in this metropolis, reference need but be made to the large number of persons, who apply for admission to hospital while suffering from one form or other of communicable disease, to see that education in the matter of isolation would be a matter of by no means slow growth. *Thirdly*, as to actual results obtained by isolating infectious persons, Sir Richard Thorne in his monograph has said:—"I could occupy you for hours in telling you instances in which epidemics have evidently been prevented by the isolation of first cases of infectious



*disease.*" The truth of this statement, indeed, has been frequently testified to in different parts of England. Isolation must, moreover, be regarded as having been one important factor contributory to the great fall\* in sickness and mortality from certain communicable diseases that has taken place in many parts of England.

Having now considered the general purpose to be aimed at in providing means for isolation, and some of the lessons to be derived from the experience of other countries, I shall proceed to consider some of the principles to be observed in locating, constructing, and planning isolation-hospitals.

#### IV.—SOME PRINCIPLES AS TO THE LOCATING, CONSTRUCTING, AND PLANNING OF ISOLATION-HOSPITALS.

The locating of hospitals for infectious diseases should largely turn, and public opinion generally suffices to make it turn, on questions relating to isolation from areas already inhabited, or likely to become so. The principles here involved relate to the isolation of the isolation-hospital. Several have indeed been formulated by Sanitary Authorities. I shall not, however, consider them in this Report, though a few remarks, bearing on the subject, will be made when dealing later with the site for isolation-accommodation for the metropolis.

The principles to be observed in constructing and planning isolation-hospitals include, it is needless to say, some or most of those that relate to hospitals used for general purposes; and, for these, reference may be made to my Report on the Charitable Institutions of Melbourne. There are, however, others, relating in the main to isolation and disinfection, that need special consideration in connexion with hospitals devoted to infectious disease. For the hospital devoted to only one kind of infection, the principles over and above those relating to general hospitals are almost the same, and may be as numerous, as for the hospital devoted to more than one infection. Hence it will be well, I think, in this Report to consider the latter, perhaps more complex, case—seeing that the isolation-hospital first to be established for the metropolitan, or indeed for any extra-metropolitan, district of this colony will be the only institution of the kind in such district for many years; that it will afford accommodation of but limited extent when compared with the full requirements of the district; that it will be designed for the isolation of more than one disease at one and the same time; and that occasions will not be infrequent, when the whole of the hospital will be utilized for the isolation of only one disease. Having regard to requirements such as these, the following principles may here be briefly referred to.

A.—*Isolability of persons and things carrying one kind of infection from those carrying another*:—Isolation of wards used for one infection from those used for others; isolation of recreation-grounds used by persons convalescent from one infection from those used by persons convalescent from others; isolation of buildings for accommodation of persons engaged with one infection from those for persons engaged with others; isolation of buildings devoted to the comparatively few officials who have dealings direct with different infections; isolation of buildings devoted to officials having no direct dealings with any infection, of buildings devoted to stores, and of buildings used for disinfected articles; isolation of buildings used as discharging rooms; isolation of buildings devoted to disinfection; of buildings devoted to the ambulance service; of buildings for temporary reception of the dead. I am not aware that as yet it has been considered necessary to carry out intra-hospital isolation to the extent here indicated. I am not aware that it has even been considered necessary to prevent nurses and ward-maids engaged in wards used for different infections from using a common dormitory, room, or recreation-ground. Indeed, the Metropolitan Asylums Board of London—an authority carrying on isolation on a scale not even approached in any other part of the world—have not observed this precaution. But, not the less, the precaution in my opinion is one which should be taken, and demand for the observance of which, let the question be but fairly before the public, committees of management will find it difficult to resist.

B.—*Ready disinfectability of all structures likely to become infected*:—The materials used in the construction being such as admit of being readily and efficiently disinfected. If there is likelihood of the wards being wanted now for one

\* In London there are 4,800 beds available for isolation. In the year 1896 more than 22,000 persons (chiefly those affected with scarlet fever) in that extensive community were isolated; and the mortality from scarlet fever during the past 60 years has fallen actually by two-thirds.

and then for another kind of infection, it will be necessary to construct them of such materials; and, if it is contemplated that they may be used for exotic infections, then the necessity for this requirement will be still more imperative. And what applies to the wards applies also, though perhaps with less force, to other buildings set apart for the accommodation of persons or for the storage of things that are in an infective condition. The buildings should, if possible, be so constructed that they may be readily hosed out, and that the water used in the process may if necessary be retained for a while for thorough disinfection.

The question thus arises as to the nature of the materials to be used in the construction of the buildings. In answering this question, it will be well to bear in mind that shelter with stability in different conditions of weather, and security against fire, sufficient to convey a sense of repose to the inmates, as also equability of temperature are factors of as much importance to the well-being of infectious as of non-infectious patients. These conditions cannot be supplied so well by means of wood, felt, canvas and the like, as by earthy materials. It is said by some that they can be supplied by the former as well as is really required in the interests of the patients, as well as the community can afford, and indeed better than the homes of the patients would in most instances supply. In my opinion it is not the case that, for the different seasons of the year, these materials have yet been used in such a manner as to supply the just requirements of the patients, of their relatives and friends. For inhabited buildings, wood, felt, canvas, and other organic materials—*quâ* such materials—may in many respects be more wholesome than iron, terra cotta, concrete, brick, stone, or other inorganic materials. But it is difficult, if not impracticable, so to use them as to provide for long the required degree of shelter, of stability, and of homœothermicity. No doubt, they have been used, and in some circumstances with a fair measure of success. But I contend that for the most part the use of them has been attended by results mischievous to the patients—results which in all probability would not have occurred had other materials been used. The Metropolitan Asylums Board of London have, it is true, some wooden wards. But it is significant that, though they have as many as 4,800 beds in ten separate hospitals, the vast majority are in brick buildings; also that, except on occasions of emergency, when, owing to exceptional infection-prevalences, wooden structures are rapidly constructed to be taken down on the abatement of the prevalence, they have not for many years past built in any other material than brick; and that the Park hospital quite recently completed for 548 beds is, and the Grove hospital now building for 520 beds will be, of the same material. It may also be noted that the isolation-hospitals just built, one at Southampton and the other at Hastings, England, the former at a cost of £30,000 for 70 beds and the latter at a cost of £14,000 for 46 beds, are of brick. For an emergency, the best must needs be made of materials that can be obtained at small cost, and be put together with the greatest expedition; but, for permanent use, year in and year out, wood, canvas, and such like material should not be employed in the construction of a fever-hospital. Over and above all this, there is the paramount consideration already mentioned, viz., that the hospital must be available in its entirety now for one infection and then for another—a condition which involves a form of construction that will allow of ready and effective disinfection, and one which leaves no room for hesitation in deciding as to whether the material to be used is to be selected from the one or from the other group above mentioned.

There is also another aspect of this question that is, I think, worthy of passing attention. If charity is largely instrumental in raising funds for establishing an isolation-hospital, it is possible that the latter will be regarded more in the light of a charitable institution than as a part of the municipal equipment against infectious disease—as a means, *i.e.*, for relief of the individual sufferer rather than for protection of the community against transmission of infectious disease. If the hospital be started, as it were, essentially by charity, charity may be apt to demand aid for the individual patient whenever it can be given—at any rate when it can be given without interfering with the more general and beneficent purpose of protecting the community against



infection. In other words, charity in such a case will frequently demand admission for all sorts of infections ; and the view, that the materials to be used in the construction should admit of being readily and efficiently disinfected, will assume redoubled force.

If it be said that, by the use of the less expensive materials, a hospital may be established of sufficient extent to prevent the likelihood of all the wards being at any one time required for only one kind of disease—my reply is that this is at least problematical, if not impracticable, for many or most communities ; secondly, that, taking one season with another, the materials referred to do not supply the conditions required for the patients ; thirdly, that the use of one of the materials, wood, is not, owing to the cost of maintenance, so economical as may on first thoughts be supposed ; and, fourthly, that, though I would advocate the use of earthy materials in the construction of a certain number of the wards, the rest of the wards might be constructed of organic materials for use at certain seasons, and at other times in cases of emergency.

Iron wards constructed with double walls have been used, it is said, with a considerable measure of success when supplied with means for equalization of temperature.

In my opinion it is well, for floors, to use asphalt on concrete ; and for other parts of the interior, asphalt, glazed\* tiles, glass, enamelled iron, or hard-setting cement.

*C.—Ready removability of all infected articles and discharges for the purposes of disinfection or destruction.* In order to realize the necessity for this, brief reference may be made to some of the measures of internal administration to be taken at an isolation-hospital.

The patient, on arrival in the receiving-room, is placed on a low noiselessly-wheeling broad stretcher ; the nature of the disease is diagnosed ; the patient is dressed in a hospital jersey and nightgown, wrapped round in a hospital blanket, and removed to the ward ; while all articles (clothing, bedding, and other) brought to the hospital with the patient are at once removed to the disinfecting-room, whence, when thoroughly disinfected, they are removed and stored in a special room until required either by the patient when leaving the hospital or, in the event of death, by the patient's friends. The bed-linen, blankets and coverlets, the mattresses and beds, are frequently disinfected. All soiled articles of bedding and clothing are at once removed for disinfection. The patient drinks from no vessel and uses no towel that has been used by another patient, unless such article have first been cleansed. When the patient is *getting about* again a special hospital dress is worn ; and when about to leave the hospital the patient dresses in a special *discharging-room* in the clothing brought at the time of admission and since disinfected, the clothing worn by the patient while in hospital being at once removed and disinfected. The doctor, the matron, the nurses, and the ward-maids wear only such outer clothing as can be readily washed and disinfected ; and the latter processes are carried out at frequent intervals. The doctor and the matron, in moving from ward to ward devoted to different classes of infectious illness, put on cloaks specially provided for the particular ward about to be entered, and wash their hands in a disinfecting solution. Nurses also, when transferred from one ward to another devoted to a different kind of infection, put on newly-disinfected clothing. The visiting of patients by relatives and friends is limited as much as practicable ; and a special outer covering is provided for each visitor prior to entering a ward. The internal surfaces (floor, walls, and ceiling), and the articles of furniture, are frequently wiped over with a damp disinfecting cloth.

It will thus be seen that the readiest facilities must be provided for removal of infected articles.

*D.—Uninfectivity of all persons, all articles, and all discharges allowed to leave, or to be removed from, the hospital.* This, in so far as it affects the construction and the plan of the hospital, involves the condition of the fencing ; the efficiency of the disinfecting and incinerating appliances ; the provision of rooms properly equipped for the changing of clothing, on entering and again on leaving the hospital, by all persons having dealings with any infection ; the introduction of drainage arrangements allowing of ready and efficient disinfection of infective discharges ; and the provision of means for visitors holding telephonic conversation with infective persons, as well as of recreation-grounds, attractive enough to the nurses and others employed at the hospital to limit

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\* Glazed tiles are now made so as to overlap at the edges, and to admit of being retained in position—for ceilings—by screws.

their excursions abroad. It may also be noted that, as far as practicable, the wards should be so constructed as to allow of the air being abstracted from each ward and passed through fire.

E.—*Comfortableness of the accommodation for the officers, nurses, and other persons engaged at the hospital.* There is necessarily attaching to the administration of an institution such as this a considerable degree of confinement, and the members of the staff are brought into daily contact with acute communicable disease ; so that every condition conducive to health must, as far as practicable, be provided. In other words, not only must the accommodation be thoroughly wholesome, but healthy outdoor and indoor recreation must be amply provided for.

F.—*Advisability, prior to building, of deciding the total amount and the various kinds of accommodation required ; of deciding the number and the kinds of infections to be provided for, especially whether exotic infections are to be included ; of deciding whether the infection-ambulance service is to be accommodated on the grounds of the hospital ; and, thirdly, of deciding whether the use of the disinfecting appliances is to be limited to the requirements of the hospital or to be allowed for articles taken to the hospital from any part of the district for which the institution is established.* It will be understood that observation-wards are a necessity, and that accommodation for a few cases of such diseases as erysipelas and puerperal fever may prove of great service. If only one hospital be established, the ambulances, which certainly should be under the same management as the hospital, might very well be kept on its grounds ; but, if more than one hospital be established, the location of the ambulances may demand special consideration. If the disinfection is not to be limited to the requirements of the hospital ; if, as in some districts in England and as is the case for instance at Glasgow, one great disinfecting centre is to be established at the hospital for any articles of bedding, clothing, and furniture that may need disinfection ; if the hospital-disinfecting appliances are to be used also for mould- moth- and vermin-infested carpets, mattresses, and other articles of furniture—the arrangements for disinfection will need to be on a proportionate scale.

G.—*Advisability of planning the hospital as far as practicable in its entirety, prior to erecting any of the permanent buildings,* the position and the size of the several buildings and of the open spaces about them being first determined. In any case, the extent and location of the administration-buildings should, if possible, be determined, so that there may be no need of makeshift arrangements when later an extension of the accommodation is required either of a permanent nature or for the purpose of meeting an emergency. If it is desired in the first instance to provide not more than, say, 40 or 50 beds for two different infections, and to allow of extensions as opportunities arise, then the suggestions, given in Appendix B and referred to in my Report on the Charitable Institutions of Melbourne, will, I think, be worthy of attention. If 80 or more beds are in the first instance to be provided, there will be no need of the temporary arrangements put forward in those suggestions.

#### V.—ISOLATION IN THE METROPOLITAN DISTRICT.

Other questions, which it may be desirable to bring forward concerning isolation, will now be considered ; and the requirements of the metropolis will in the main be taken in illustration of them.

##### A.—*Extent of Communicable Diseases, and of means provided for Isolation of them, in the Metropolis.*

First, let consideration be given to the extent of prevalence which diseases of a communicable character have heretofore attained in the metropolis. The subjoined table (Table A) and charts (Charts A to K), compiled from the Statistical Registers, will here be of service. The table shows the annual numbers of deaths for the thirty-six years, 1861–96, from certain specified infection-diseases that have occurred on the one hand throughout the metropolitan area, and on the other hand in the metropolitan hospitals. The charts present most of these data in a graphic form, charts A–J referring to separate diseases, and chart K to the same diseases conjointly,















CHART D.- DEATHS FROM CHICKEN POX.

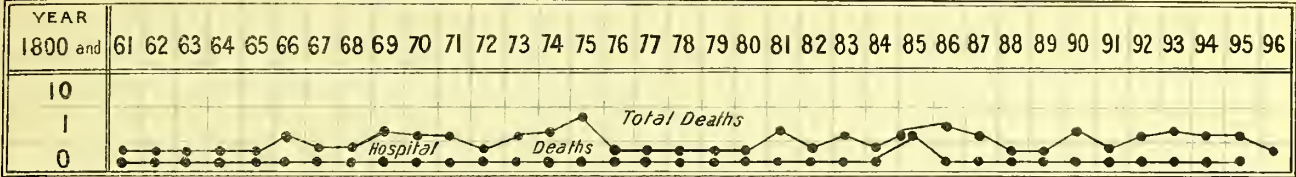


CHART E.- DEATHS FROM ERYSIPELAS.

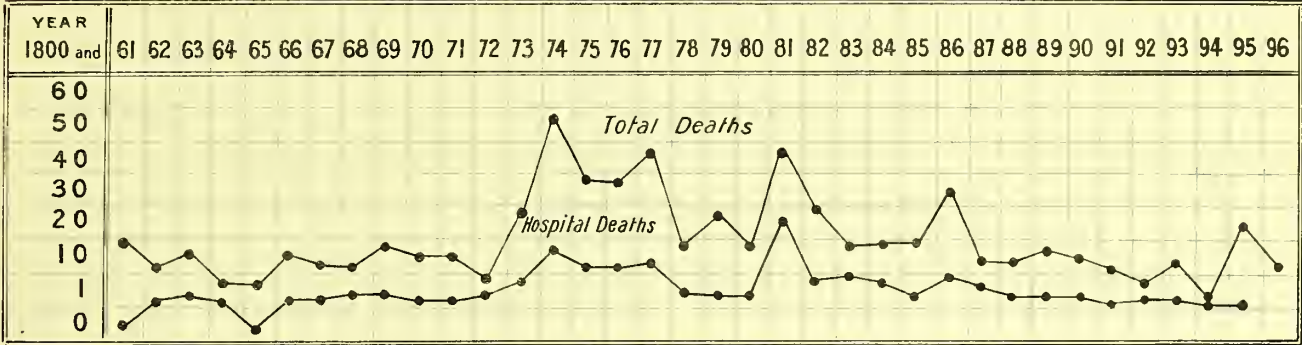


CHART F.- DEATHS FROM PUERPERAL FEVER.

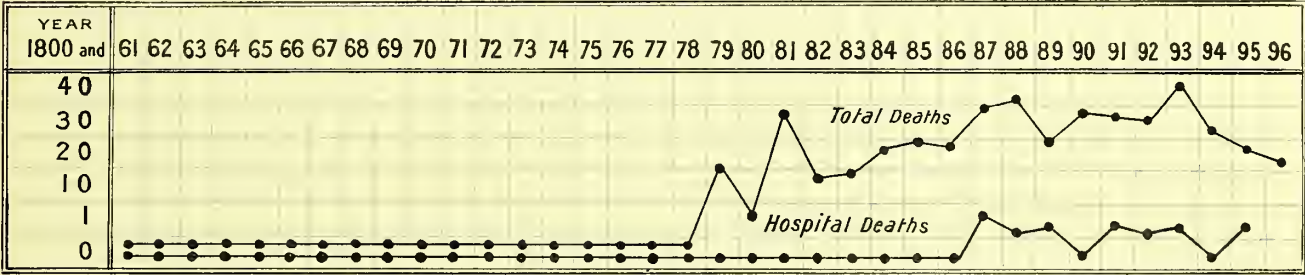


CHART G.- DEATHS FROM WHOOPING COUGH.

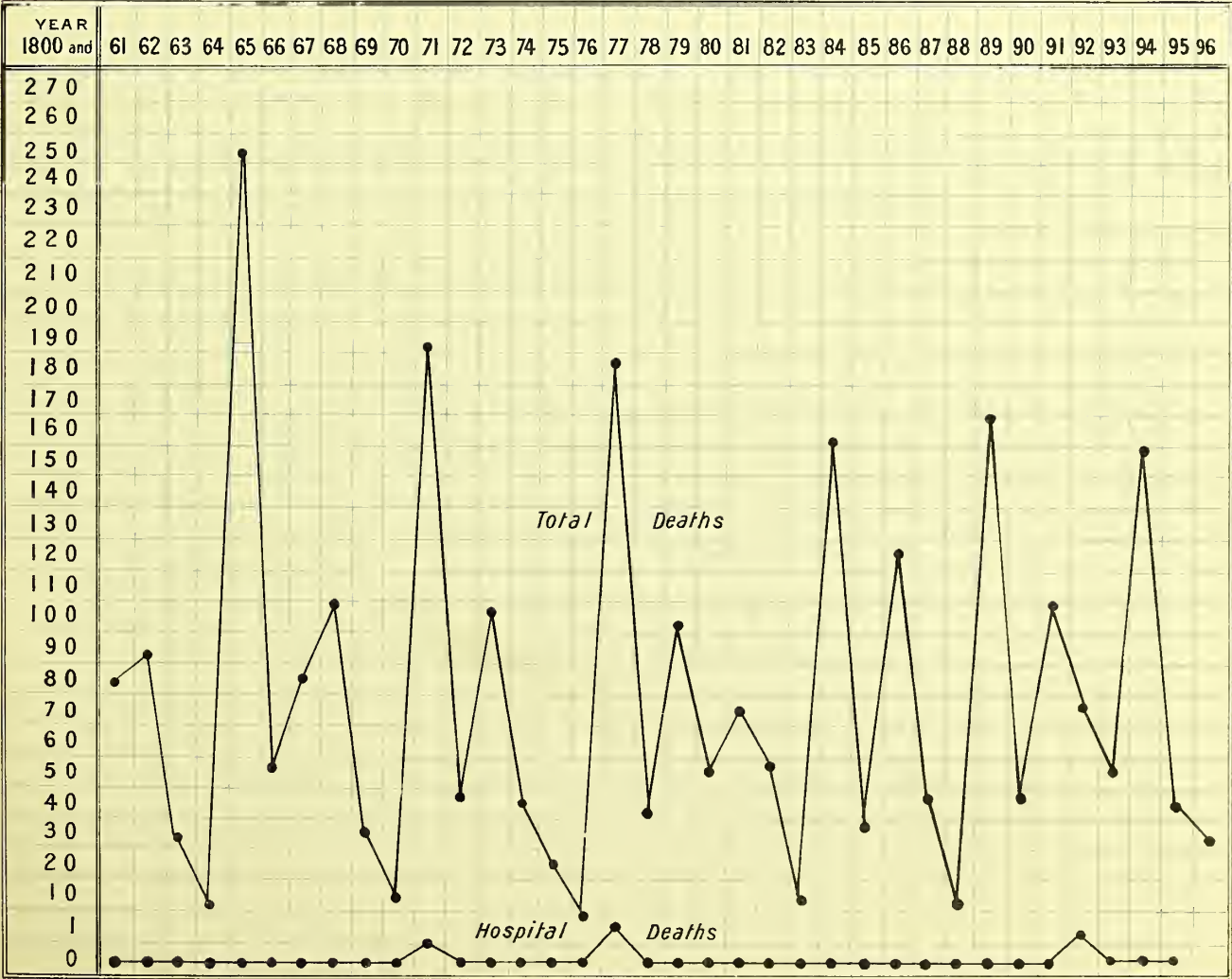






CHART H.- DEATHS FROM MEASLES.

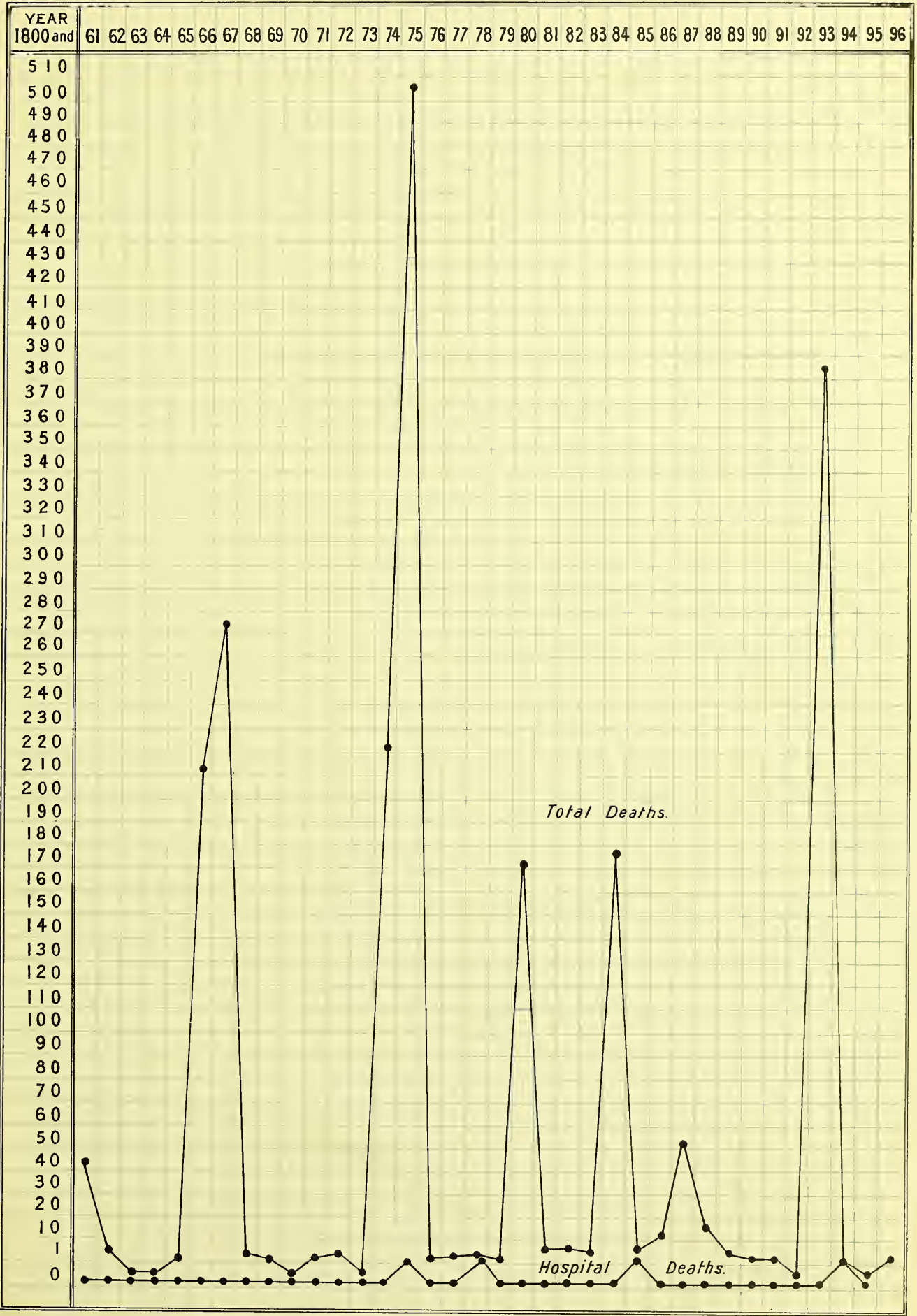






CHART I.- DEATHS FROM SCARLET FEVER.

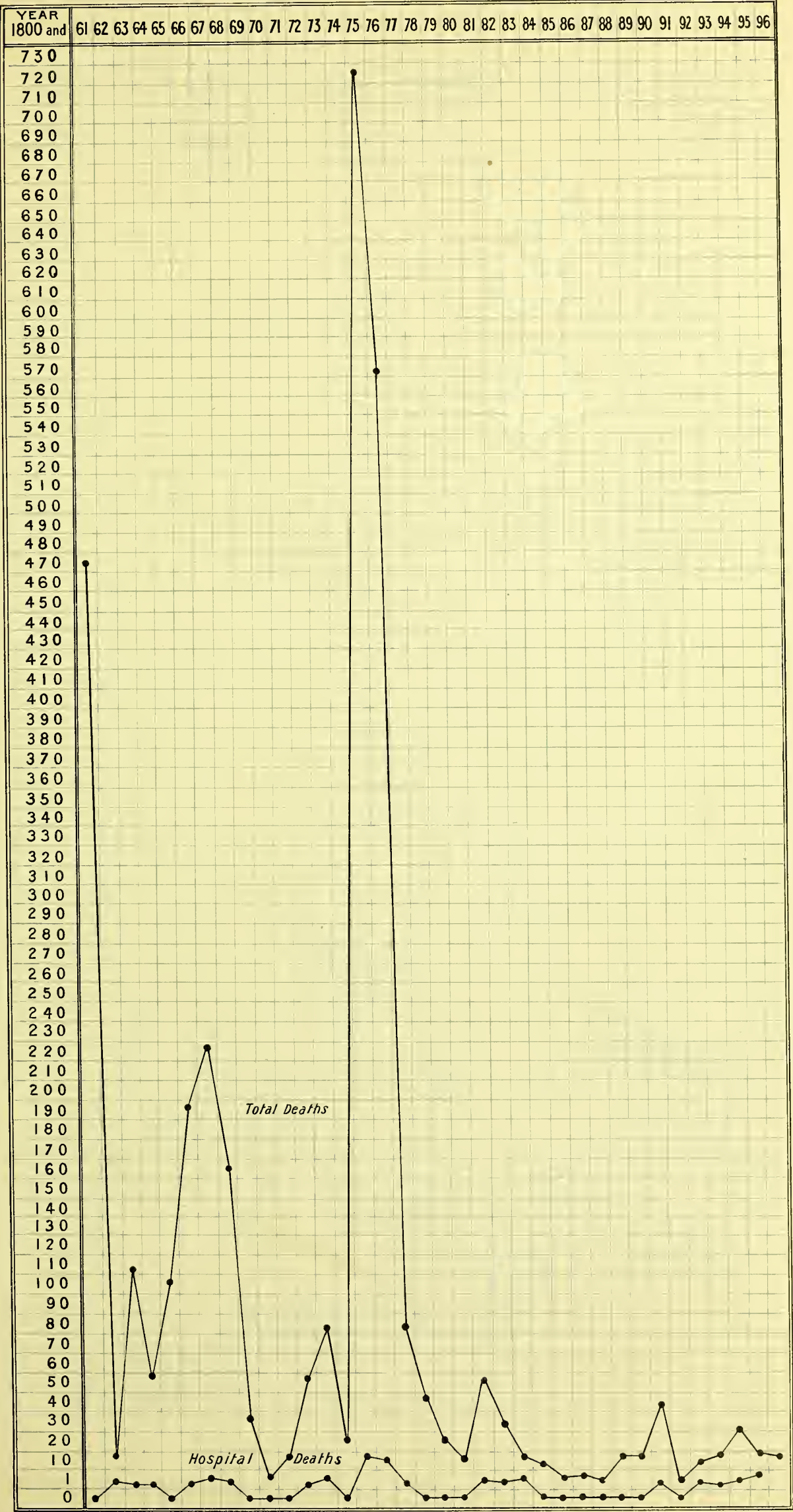
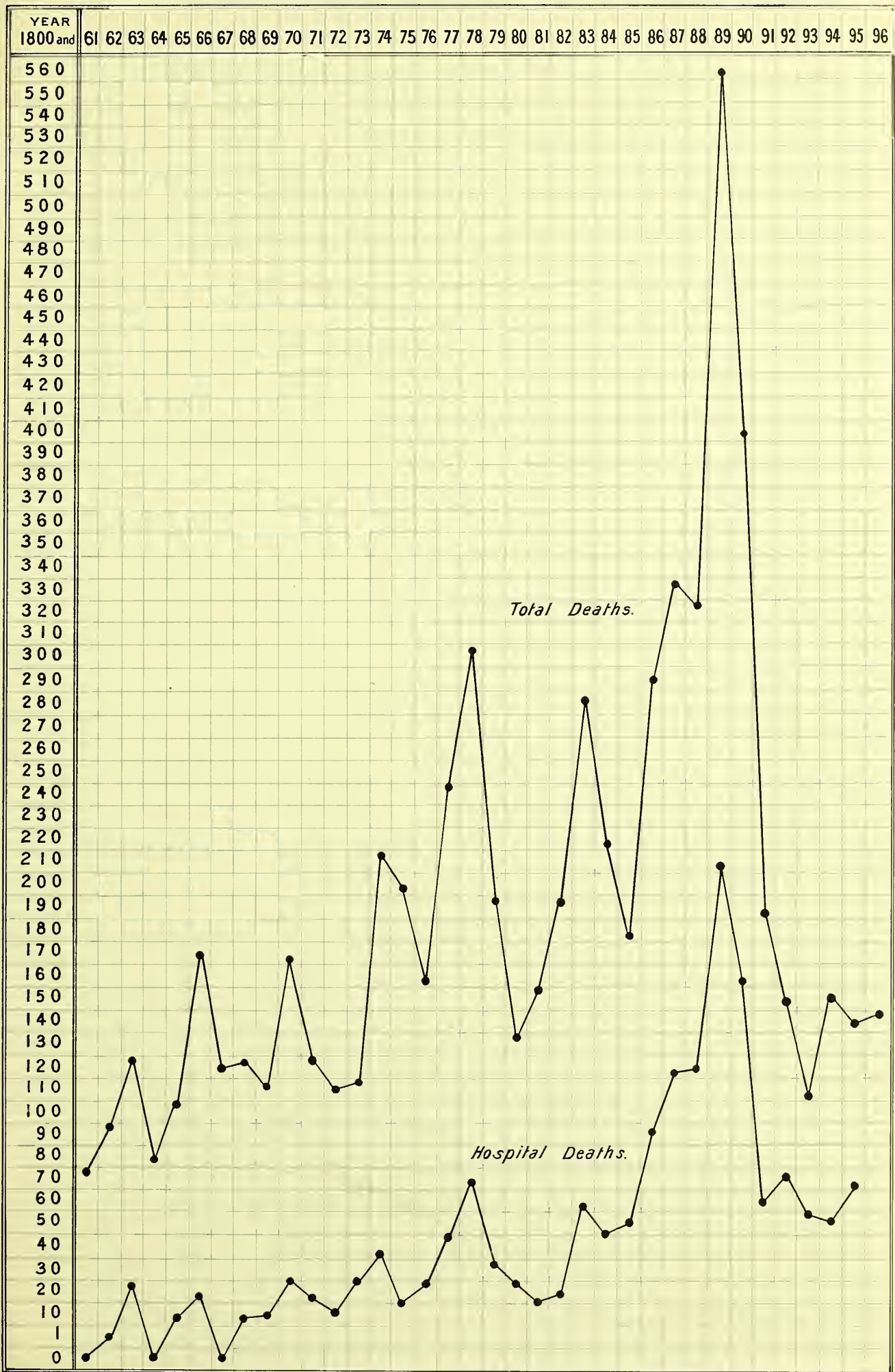






CHART J. - DEATHS FROM TYPHOID & INFANTILE FEVER.







# CHART K- TOTAL DEATHS

*In successive years from the Ten diseases, to which Charts A-J refer, in the upper curve for the whole of the Metropolitan area, and in the lower for the Metropolitan hospitals.*







On referring to the preceding table and charts, it will be seen that deaths in hospital, whether from croup and diphtheritic croup, from diphtheria, measles, scarlet fever, typhoid fever, or whooping-cough, have formed but a very small proportion of the total deaths from those several diseases in the metropolitan area ; in other words, that the vast majority of persons, who have died of these diseases, were treated, not in hospital, but at their homes—a fact the importance of which will be the more readily gauged on making further and more detailed examination of the table and charts.

Taking the more important of the above-mentioned diseases, and limiting the examination to the period 1861–90, the following data are worthy of special note :—

*Croup and Diphtheritic Croup.*—The annual number of deaths from these diseases was never fewer than 30 ; on eleven occasions it exceeded 60, on six it exceeded 80, and on three 120 ; but of the total of 1,845 deaths in the whole of the thirty years only 27 took place in hospital. For the successive decades 1861–70, 1871–80, and 1881–90, the deaths from these diseases throughout the metropolitan area numbered 467, 565, and 813 ; and of these 13, 12, and 2 respectively took place in hospital. Objection may, perhaps, be taken to any reference being made in this place to these diseases, on the ground that there is not general agreement as to the communicability of either of them. However this may be, it is well known that diphtheria has very frequently passed under the names croup, diphtheritic croup, laryngitis, and so on, both in this and in other countries. Indeed, an investigation into an outbreak of diphtheria rarely fails to elicit the fact that cases called croup have been diphtheritic, and that much of the outbreak has actually been owing to neglect of precautions against extension of the disease from persons stated to be affected with croup. The relative numbers of the deaths from laryngitis, from croup with diphtheritic croup, and from diphtheria for given periods, moreover, support the view here taken. In other words, though adhesion be given to the dualistic view concerning croup and diphtheria, diagnosis may be so frequently at fault as to raise the question whether isolation should not be observed in cases supposed to be croup, unless the diagnosis be very clear.

*Diphtheria.*—The yearly number of deaths from diphtheria exceeded 50 on twenty-one occasions, on nine occasions it exceeded 100, four times it exceeded 150, twice it exceeded 200, and once it numbered 300. With exception, however, of three occasions, the yearly number of deaths from this disease in hospital never exceeded 10, and on those three occasions the numbers were 14, 38, and 45 respectively. *Of the total of 2,733 deaths in the metropolitan area in the thirty years only 181 took place in hospital.* For the three successive decades the numbers of deaths throughout the metropolis were 1,008, 679, and 1,046 ; and of these only 35, 31, and 115 respectively took place in hospital.

*Erysipelas.*—Deaths from this disease in the metropolitan area during the thirty years numbered 625, and of these 159 took place in hospital. It appears that for the successive decades the numbers of deaths for the whole metropolis were 120, 287, and 218, of which 13, 69, and 77 respectively took place in hospital. Some of these relate no doubt to persons who contracted the infection while in hospital on account of some other condition.

*Measles.*—The yearly number of deaths from measles exceeded 170 on six occasions, 200 on four occasions, twice it exceeded 270, and once it reached 508. *The deaths for the thirty years numbered 1,762, and of these only 4 occurred in hospital.* For the successive decades the total deaths were 545, 917, and 300, and of these 0, 2, and 2 respectively occurred in hospital.

*Puerperal Fever.*—Deaths from this cause prior to the year 1879 were no doubt registered under some other name ; but, *for that and the succeeding years the number of deaths registered as due to puerperal fever was 329, and of these only 11 occurred in hospital.*

*Scarlet Fever.*—The yearly number of deaths from this disease exceeded 100 on eight occasions, 200 on four occasions, 450 on three occasions, twice it exceeded 570, and once it was as high as 727. In no single year, however, were there more than 18 deaths from scarlet fever in hospital ; *indeed, only 55 of the total of 3,232 deaths, that occurred in the metropolitan area in the whole of the period of thirty years, occurred in hospital.* The numbers of deaths for the three successive decades were 1,392, 1,645, and 195 ; and of these 11, 36, and 8 respectively took place in hospital.

*Fever.*—The yearly number of deaths from typhoid and infantile fever was never below 75 ; on twenty-seven occasions it exceeded 100, on sixteen it exceeded 160, on eleven 200, on seven 250, and on five 300 ; twice it exceeded 400, and once it rose to 560. But the yearly number of deaths in hospital from these diseases on only four occasions exceeded 100, the numbers for these years having been 121, 124, 210, and 161 ; and on only eight occasions did it exceed 50. *For the whole period of thirty years the deaths numbered 5,968, of which only 1,354 occurred in hospital.* The numbers for the whole area during the successive decades were 1,197, 1,818, and 2,953 ; and of these 104, 330, and 920 respectively were hospital-deaths.

*Whooping-cough.*—The yearly number of deaths from whooping-cough on sixteen occasions exceeded 50, on twelve occasions 80, on nine occasions 100, on five 150, on three 180, and once it reached 263. *But, though the total of deaths from this disease in the course of thirty years reached 2,330, only 3 of these occurred in hospital.*

The numbers of deaths from the whole of the diseases above mentioned, and from chicken-pox, are shown for successive years in Chart K.

From these returns of *deaths*, it would be possible to calculate the number of *cases* of these several diseases that have occurred, could some average of fatality be taken as a basis for calculation. But the fatality of communicable disease—both that of communicable diseases in general and that of each communicable disease in particular—varies so very greatly as to forbid acceptance of any average that might be proposed. It would, however, be safe to say that, taking together the several diseases now under consideration, the average fatality has not exceeded 10 per cent. It is of interest in this connexion to observe that among the 2,363 persons notified to the Board as affected with typhoid fever in twenty of the metropolitan municipalities during the first half of the year 1890, there were 249 deaths ; and that though there were as many as 201 deaths among the 607 persons notified to the Board as affected with diphtheria for the same period and the same area, the cases were in all probability very much more numerous than is here represented ; while as concerns scarlet fever the fatality seems for considerable periods to have been even below 5 per cent. Taking, then, 10 per cent. as the average maximal fatality, and 18,824 as the number of deaths that have occurred from the several diseases specially dealt with above in the course of the whole period of thirty years throughout the metropolitan area, a calculation is readily made as to the probable minimal number of *cases* of these diseases that have occurred. Probably, however, taking one disease with another, and one prevalence with another, the fatality has not exceeded 5 per cent.; and on this basis it would appear that in the metropolitan district *there have been during the period under review more than a third of a million of cases of these communicable diseases.*

*The facts, which have now been singled out for particular mention as to deaths from certain infection-diseases, show how small has been the number of those that have taken place in the metropolitan hospitals, in comparison with those that have taken place in the metropolis outside those institutions; and the estimate, just given, of cases of those diseases, while indicating the extensive nature of the prevalences in the metropolis, affords further insight into the limited extent of hospital-isolation provided.*

It remains, however, to be stated that for the three successive decades, the thirty years now under review, the numbers of deaths from the above-mentioned diseases—puerperal fever being set aside—throughout the metropolitan area were 5,509, 6,793, and 6,193 ; and that of these the percentage proportions formed by those that occurred in hospital were respectively 3·1, 7·1, and 18·1, proportions which show large progressive increase of hospital-treatment for the persons who died of these diseases. If, however, in addition to puerperal fever, the diseases *erysipelas* and *fever* be excluded, these proportions become 1·4, 1·7, and 4·2 ; and even this increase would not have been so marked, had the prohibition as to admission of diphtheritic patients into the Children's Hospital been made at an earlier date than it was. In other words, any improvement that has taken place in the matter of hospital-treatment or -isolation has been almost confined to persons affected with typhoid fever, there having been but little improvement in connexion with other communicable diseases.



It may be added that for the six years, 1891 to 1896, the number of deaths in the whole of the metropolitan district from all the diseases dealt with in the charts was 2,935, and that only 485 took place in hospital. It will thus be seen that for the thirty-six years, 1861-96, the total deaths were 22,486, and that only 2,347 of them were recorded from the hospitals.

*B.—Effect of Non-Isolation on Epidemic Prevalences in the Metropolis.*

The facts above portrayed forcibly suggest the question whether the number of deaths registered to infection-diseases in the metropolis has been in any large degree owing to the fact that hospital-isolation was observed in so few instances. This question will best be answered after consideration has been given to the risks incurred by a community in which isolation is not observed.

*There is, first, liability to contract infection on the part of persons living in the house with the patient.* One or more of them must of necessity wait upon the patient, and undertake the removal and disinfection of the discharges and of the soiled bedding and clothing. The house may be, and but too often is, confined, overcrowded, and ill-ventilated; and, as a matter of fact, it is not uncommon—rather it is of frequent occurrence—for healthy persons to be actually sleeping in the sick room. And, let it be added, the risks in this country are the greater owing to the general want of gratuitous medical relief for the sick poor in their homes.

*Secondly, there is liability to contract infection on the part of persons not belonging to the household invaded.* Visitors necessarily incur risks of infection. Customers at the shop, which may constitute the larger part of the house, may contract infection in a variety of ways. The healthy members of the household, and those but slightly affected with the disease, may be attending day- or Sunday-school, or some place of employment or of public resort, and in so doing may make use of the tram, cab, bus, train, or other public conveyance. It is also to be noted that, in the absence of properly constructed sewers, it is difficult to deal properly with infective discharges. It is by no means a light and inexpensive task to deal properly and thoroughly with the solid and liquid discharges from the infectious sick; while disinfection in most cases cannot possibly be complete as regards rinsings of utensils, or as regards water used in bathing or in washing infected articles such as those of bedding and clothing. As a result, infective matters lodge about the home, on the outdoor premises, in the right-of-way, or in the street gutter; and, being desiccated in dry seasons, they are blown in all directions, and so contaminate the atmosphere and the water- and food-supply. Certainly, in the cases of houses of large proportions, properly appointed, and on ample grounds, it may be a simple matter to render infective matters innocuous; but in most other cases this is impossible. The general want, too, of gratuitous medical home-relief for the poor, already adverted to, brings about a large attendance at the out-patient rooms of the general hospitals, with the result that public conveyances, and out-patient hospital departments may become so many infection-exchanges. For illustrations of the use made of the out-patient rooms of general hospitals by persons suffering from infectious or other forms of communicable disease, reference may be made to my report on Melbourne. During the first half of the year 1890, as stated in that report, many diphtheritic patients were treated in the out-patient departments of the Homœopathic and Children's Hospitals—60 or 70 at the former hospital and several almost every week at the latter, the attendance having been continued by many of these patients for several weeks. In the first instance, and as often as their strength allowed, they attended in person at the hospital; and some, having ceased after a while to attend in person, were treated, it is stated, by means of prescriptions given at the hospital on reports furnished there by their friends. Numbers of persons suffering from typhoid fever were also treated as out-patients at these two institutions during the above period—many of them for as long as two or three weeks—the patients having attended in person at the hospitals several times. Some of these patients were, after a time, admitted to hospital. The treatment of infectious cases, after the fashion just mentioned, in the out-patient departments of the Melbourne hospitals has continued to the present time. It is a matter strongly to be deprecated for various reasons, not the least of which is the incompleteness of the arrangements for preventing transmission of infection at the hospitals themselves. But, while the arrangements for dealing with infectious cases remain so unsatisfactory in the metropolis, it seems unreasonable to ask the managers of those institutions to put a stop to it.



It will, of course, be understood that the risks of contracting infection are not alike in all cases. The infection of scarlet fever may be contracted from air-borne virus ; that of typhoid fever is generally the result of contamination of the water- or food-supply by discharges from some typhoid patient ; and the contraction of the infection of erysipelas or of puerperal fever probably needs a cut, a rent, or an abraded surface, the media of infection in the latter case being generally the hands, the clothing, or the appliances of the attendants.

*If regard be had to these several considerations concerning the difficulties of rendering home-isolation and home-disinfection complete, it must be concluded that the marked abstention from indoor hospital treatment, or more accurately from hospital-isolation, has not been without its influence in keeping up the prevalence of communicable diseases in the metropolis ; rather it must be admitted that it has had very largely to do with maintaining those prevalences.*

*C.—Reason for Abstention from Hospital on the part of the Infectious Sick of the Metropolis.*

What was the reason for this marked abstention from hospital on the part of the infectious sick that died, and of the tens of thousands of others that recovered ? The answer is simple—there was no other course open to them. At none of the metropolitan hospitals are persons admitted when affected with diseases that are communicable by so-called personal infection. Though this practice has not at all times been rigidly observed, it is a fact that for some years past no case, for instance, of scarlet fever, diphtheria,\* measles, erysipelas, whooping-cough, or puerperal fever, has been received into any metropolitan hospital, except the Melbourne, and into that only as a matter of real urgency ; and while, as regards persons suffering from typhoid fever, admission is given at the hospitals so far as the accommodation permits, that accommodation must be looked upon as limited, if regard be had to the great number of cases that occur, to the small number of deaths from typhoid fever in hospitals compared with the number outside, or to the fact that many patients in the typhoid season have been refused admission. Concerning the refusals reference may again be made to my Melbourne report. As there stated, of those, who applied—most of them in person—at the Melbourne Hospital during the twenty-two weeks ended 21st May, 1890, while suffering from recognised typhoid fever, or from fever which no doubt in many cases was typhoid, 263 could not be admitted ; and of the persons who, while similarly suffering, applied with *orders* for admission at the Alfred Hospital during the first half of the same year, 58 could not be admitted. It is said that within the latter period 100 or more were refused admission at the Homœopathic, and a considerable number also at the Children's, Hospital. It would not be possible to determine the total number of persons to whom admission was refused ; for many were driven round from one hospital to another, and not a few of these may have been early admitted. It is, nevertheless, true that large numbers were not able to gain admission early ; and that many made repeated application before they succeeded. This, it appears, was a matter of necessity, for at the time referred to as large a proportion as 50 or 60 per cent. of the medical beds at the several hospitals was devoted to typhoid patients. It is, moreover, to be borne in mind that knowledge of the difficulty in the way of gaining admission to hospital no doubt deterred patients from making application who would otherwise have gladly availed themselves of the isolation and treatment provided in an hospital. It has been frequently stated that during more recent years the hospital-accommodation for typhoid fever has been ample. But this cannot be accepted as correct, for each year there have been hundreds of persons affected with typhoid fever who, though in urgent need of hospital-treatment, have passed through their illnesses at home. In Footscray alone, as shown by Dr. Shirres, there were 86 persons affected with this disease in the first four months of the year 1891 ; and, though but few of these could possibly have received treatment in their homes without the health of other persons being endangered, only two, so far as could be ascertained, were treated in hospital. A similar experience, moreover, has been met with each year since. It cannot, therefore, be admitted that, even for typhoid fever, the accommodation provided is sufficient.

\* During the first half of the year 1890, as many as 72 diphtheritic patients were admitted to hospital. It may, however, be noted that as many as 46 of these were admitted to the Children's Hospital, and that the admission of such patients into the latter hospital has now for about seven years been wholly forbidden.

It is at times asked whether good cause can be shown for refusing to admit infectious persons at general hospitals. This question has been already discussed, and answered in the affirmative; and as regards the metropolitan hospitals that answer can but be emphasized. Such means, as can be provided for carrying out isolation at those institutions, are of a most imperfect nature, and cannot well be otherwise—so imperfect, in fact, as to render admission of persons suffering from dangerous infectious diseases unjustifiable.

*The data thus presented will, I think, suffice to show that the abstention from hospital on the part of persons affected with communicable disease in the metropolis has been no voluntary matter; there was no other course open to them, to their friends or relatives, than to do what little was possible towards carrying out isolation at home.*

#### D.—Present Condition as to Isolation in the Metropolis.

*The broad fact now stands out that, exotic disease aside, there is for the infectious sick of this metropolis no means of isolation, so that even the poor, no matter how poor, when suffering from infectious disease must shift for themselves—to the risk of contraction of infection on the part of persons with whom and among whom they live. With typhoid fever, too, the case is far from being as it should be.*

#### E.—Isolation Requirements in the Metropolis.

*The several considerations, which have now been submitted, speak in no uncertain terms of the advisability of providing beforehand means for isolating and treating persons suffering from communicable diseases in this metropolis.*

These premises granted, consideration may be given to the amount of accommodation to be provided.

First, however, shall provision be made for typhoid patients? Undoubtedly, the possibility of requiring such provision should not be overlooked. Reference need but be made to the history of typhoid here to learn as much, for in its outbreaks this disease has been so extensive that the accommodation in the general hospitals has been wholly insufficient. Circumstances have, indeed, arisen when, though as large a proportion as 50 or 60 per cent. or more of the medical beds in the Melbourne general hospitals has been given up to typhoid fever—to the exclusion, indeed, of large numbers of persons who, while suffering from other affections, would under ordinary circumstances have been at once admitted—typhoid patients have in large numbers been refused admission, others have been in part treated as out-patients, and very many who should have been treated in hospital have been suffered to remain in their homes, spreading disease broadcast about them. Moreover, it is quite out of the question to attempt to provide for such extensive outbreaks on the grounds of the general metropolitan hospitals. Of course, if a new general hospital were built, or if land adjoining the present hospitals could be obtained, the necessary accommodation might be provided. But: would it be wise to make special provision of this sort in connexion with a general hospital and not available for infectious diseases; while, if made in connexion with an isolation-hospital, it would be available for any communicable disease that might from time to time be prevailing? The conclusion indicated seems rather to be that means for isolation of typhoid-fever patients may be required in the infectious diseases hospital to be provided for this metropolis. If objection be raised on the ground that typhoid has already fallen off largely; that, being a preventible disease, it must still further fall off in course of time; and that in its prevalences here it is associated with contamination of water and of milk and with want of proper means of surface-conservancy—the answer is that lasting improvement as regards typhoid fever cannot be hoped for until these defects have been remedied; and that, when this has been accomplished, the increase of population, which will, it may be expected, have meanwhile taken place, will bring about, in all probability, the necessity for more beds for the other kinds of infection-disease. It appears, then, that accommodation for typhoid fever may be required, and that the necessity for providing it should not be overlooked.

If so, and if it be granted also that the other infection-diseases, several times referred to in what has gone before as needing isolation, are to be provided for, the proportion of about one bed to a thousand of the population cannot be regarded as excessive. This proportion has long been regarded as the standard in England; and the experience already obtained of isolation there has been such as to show that it should be increased rather than diminished.



Concerning the metropolis, I wrote in 1891—"At least a hundred beds should be provided in permanent buildings ; at least another hundred should be in readiness in buildings which may be of a less permanent character ; and every measure should be taken so that the remaining (say, 200) beds can be placed rapidly in readiness as circumstances may from time to time require."

For details of an approximate estimate, prepared by Mr. Le Capelain in 1891, at the prices then ruling, of the cost of providing isolation-accommodation, reference may be made to Appendix A to this Report. The sum of £59,150 would provide accommodation for 121 patients, for a nursing and domestic staff required for 233 patients, and for such other staff, stores, and appliances as would be required for 400 patients, all the buildings being of brick ; the sum of £52,253 would provide buildings for the same purposes, most of them, however, except the wards, being constructed of wood ; and the sum of £40,531 would provide brick wards for 112 patients, and such administrative buildings and furniture as would suffice for them. No doubt many of these items may, with prices now ruling, be reduced.

#### F.—*Location of Isolation-accommodation for the Metropolis.*

Where should this accommodation be provided ? If regard be had to the extensive area embraced in the metropolis, to the mode in which the population is distributed, and to the likely rate of growth of the population as well in the metropolitan as in the near extra-metropolitan municipal districts, it will be well, in seeking an answer to this question, to look forward to the time when there will be, say, a million of people in or near to the metropolitan area, so that the location of the beds may be such as to afford reasonable accessibility for many years to come. With this purpose in view, it will be evident that the accommodation would be most suitably provided, either on the one hand in one large institution placed centrally or practically equidistant from the eastern and western extremities of the metropolis, or on the other hand in two or more institutions placed towards the periphery of it. These different views may now be considered.

First, as to one central institution. Can a central situation suitable for the purpose be found ? The only situation of the sort that is likely to be suggested is one in the Bay, for it is out of the question to place an infectious diseases hospital in the centre of the metropolis itself. But the proposal to establish a floating establishment of the size now under consideration cannot be seriously entertained ; for, though the possibility be admitted of securely mooring in the Bay the several vessels of the requisite dimensions, it must be borne in mind that provision for the recreation of convalescents and of the staff, as well as for the washing and disinfecting of clothing and bedding, is best made on shore. In other words the hospital-ships must be near to the shore. Add to this, that the transit of patients from all parts of the metropolis must be as safe and as short as practicable, and that a Bay ambulance-service must, if possible, be avoided, owing to the rough weather frequently experienced in the Bay, and the question arises : "Where is the site that will meet these requirements ?"

It may, however, be said that a land site situate to the north of the metropolitan area, and practically equidistant from its eastern and western extremities might be selected of size sufficient to meet the likely requirements of a population of a million. Such a site may, I think, be obtained. If the distance of such a site from the furthest parts of the metropolis be considered excessive, then the only remaining plan will be to distribute the beds in two or three separate institutions towards the periphery of the metropolitan area.

In this connexion it may be observed that 300 patients being as many as one medical superintendent can well supervise, there will be nothing lost as regards treatment by providing these beds in more than one institution ; and that, if it is contemplated ultimately to distribute the accommodation in two or more hospitals, the first hospital to be built should be so placed that it will fall in with an ultimate division of the metropolitan area into two, or into three, isolation-districts. But it must not be overlooked that, if only one institution can be provided for the next ten or twenty years, a site north of the centre of the metropolis will be the most convenient during that period ; and that, should additional accommodation be required later, it can be provided in establishments placed one to the east and another to the west of this site.

The area to be taken up for the first site will vary according as it is contemplated to provide the whole of the accommodation on one, on two, or on three sites, and to provide for any exotic disease. If it is intended to isolate small-pox, then special care will need to be given both to the area and the location.

For my part, I would strongly urge that the first site be of such extent as to meet the likely isolation- and disinfection-requirements of the whole of the metropolitan area for 30 or 40 years to come, including the requirements created by inland exotic disease; and that for this purpose a site be selected about due north of the centre of the metropolis, and of an area sufficient to disarm the criticisms proceeding from the elaborate researches of Power on aerial dissemination of small-pox.

*G.—Materials for construction of an Isolation-Hospital for the Metropolis.*

As already stated, if there is any likelihood that at one and the same time the whole of the hospital may be required for one infection, there can be no hesitation in deciding whether organic or inorganic materials should be used—and this, even though no argument be taken from the serviceable nature of the materials for affording shelter, stability, and comfort, or from any considerations of economy.

Should there be any doubt as to the likelihood in this metropolis of one and the same ward being required at different times for different infections, reference need but be made to the statistics set out in the following table:—

TABLE B.

Showing the numbers of Deaths in successive years in the Metropolis from certain communicable diseases.

—		Croup, Diphtheria, and Diphtheritic Croup.	Erysipelas.	Measles.	Scarlet Fever.	Whooping-cough.
In 1861	...	132	19	41	474	82
„ 1862	...	112	11	5	18	91
„ 1863	...	91	14	0	111	35
„ 1864	...	176	7	0	58	11
„ 1865	...	166	6	2	105	263
„ 1866	...	129	13	215	198	57
„ 1867	...	199	11	278	226	85
„ 1868	...	232	10	3	165	109
„ 1869	...	146	16	1	32	34
„ 1870	...	92	13	0	5	13
„ 1871	...	54	14	2	16	191
„ 1872	...	78	8	3	56	48
„ 1873	...	164	28	0	82	107
„ 1874	...	172	58	223	25	44
„ 1875	...	116	37	508	727	25
„ 1876	...	119	36	1	571	9
„ 1877	...	164	45	3	80	184
„ 1878	...	166	17	2	47	40
„ 1879	...	136	26	1	27	103
„ 1880	...	75	18	174	14	55
„ 1881	...	84	46	6	54	72
„ 1882	...	73	29	9	30	58
„ 1883	...	59	17	5	14	12
„ 1884	...	99	19	176	10	161
„ 1885	...	129	19	6	3	38
„ 1886	...	104	34	12	5	127
„ 1887	...	137	13	64	3	43
„ 1888	...	269	13	15	17	10
„ 1889	...	464	15	6	18	179
„ 1890	...	441	13	1	41	44
„ 1891	...	208	10	3	3	99
„ 1892	...	121	8	0	13	76
„ 1893	...	43	12	385	18	54
„ 1894	...	60	3	1	30	159
„ 1895	...	72	25	0	19	43
„ 1896	...	108	12	2	17	32

It will, I think, be admitted that the data furnished in this table conclusively show that, unless the establishment be of very large proportions, the whole of it may very likely be required for only one disease at one time and for another at another



time. If this be so, then without question the materials throughout must be such as will admit of their being thoroughly and readily disinfected. It is, as already said, most probable that the first isolation-hospital to be established in the metropolis will be the only hospital of its kind for the metropolitan area for many years; that the accommodation to be provided will be unequal to the requirements of that area, even in non-epidemic times; and that, accordingly, it will frequently be used throughout at one and the same time for one kind of infection, and one only. In such circumstances ready disinfectability of the buildings is a condition of prime importance.

H.—*Constitution of Board of Management, and source of Funds, for providing and maintaining Isolation-accommodation for the Metropolis.*

I do not purpose under this heading to attempt an exhaustive discussion on the many questions concerning the mode in which the board of management should be constituted, or as to the means by which money should be obtained for building and for maintaining an isolation-hospital, or for treating the patients admitted to it from the metropolitan district; but there are a few of them which cannot well be passed by without notice in this report.

It will, I think, be clear, from the experience already mentioned of isolation-hospitals in other countries, that the whole of the administration directed to the isolation of infectious persons in one community should be conducted by one body. Even though there were no guidance to be derived from experience, it would, I think, be readily understood that, as regards communicable diseases, this metropolis constitutes, in the language of the fireman, one risk, and requires one management. The further question then arises as to the constitution of the body that should have sole management; and, as bearing upon the answer, it is to be carefully borne in mind that charity cannot be relied upon to supply the demands created by communicable disease.

If this be granted, it would seem that, in a country endowed with local government, the managing body of an isolation-hospital provided for two or more municipal districts would best be constituted of delegates from the local authorities; and, in this connexion, it is to be observed that the local councils of this colony have been furnished with all the powers that are required for providing and maintaining means of isolation, for treating the patients, and, it may be added, for recovering the expenses incurred in the treatment of such persons as can afford to pay them.

It is true that, so far as this metropolis is concerned, the constitution of the board of management is being formed on somewhat different lines; but I venture to say that it will not be long before reconsideration of it will be required.

So far, I have made no reference to the work of household-disinfection. This no doubt might be undertaken by the board of management of the isolation-hospital; but it is generally thought more satisfactory that the cleansing and disinfecting of the invaded dwellings be under the direct control of the local authority.

If it be said that the cost of conducting isolation would be burdensome or intolerable, it is to be borne in mind that, while but few conditions are so powerfully conducive to pauperization as want of medical relief among the poor, it is in connexion with communicable disease that this want is peculiarly felt; and that isolation is required, not merely in the interests of the individual and of the family affected, but in the interests of the whole community—so that in order to obtain a satisfactory result the isolation-operations must be based on a broad and liberal policy.

V. *Isolation in Extra-Metropolitan Districts.*

The questions dealt with above in regard to the metropolis will arise also in connexion with other parts of the colony; and, essentially the same answers\* as have been given in the former case will apply in the latter.

D. ASTLEY GRESSWELL, M.A., M.D., Oxon.

3rd January, 1898.

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\* The proportion of one bed to 1,000 persons would need to be much increased in the case of rural districts.



## APPENDIX A.

## INFECTIOUS DISEASES HOSPITAL.—APPROXIMATE ESTIMATE OF COST.

Description.	Brick Buildings.	Wood Buildings.	Further Reduction.
	£	£	£
1. Medical officer's quarters ... ..	1,800	1,600	1,000
2. Steward's quarters ... ..	1,000	600	600
3. Assistant medical officer's quarters ... ..	970	600	...
4. Committee-room, and general dining-room, two waiting-rooms for visitors ... ..	1,150	600	...
5. Porter's lodge ... ..	300	300	250
6. Male servants' quarters... ..	300	250	250
7. Steward's office, assistant's office, needle-room, matron's office, medical consulting-room, drug-store, dispensary, dressing-room for males, with 20 lockers and two baths, dressing-room for females, 20 lockers and baths ... ..	2,000	1,200	1,000
8. Buildings comprising dry stores-room, nurses' dining-room, lavatory, stewards' stores, mattress stuffing-room, clean linen-store, and delivery-room ... ..	2,000	1,200	1,200
9. Bakery—Baking-room, breadmaking-room, flour store-room, bread-store ... ..	600	*600	...
10. Kitchen—Clean crockery-room, scullery, vegetable kitchen, receiving-room for clothes, patients' washhouse, officers' washhouse, drying-room with horses, ironing and folding-room ... ..	3,500	2,800	2,500
11. Clothes-drying ground ... ..	75	75	75
12. Engine-house and stack, engine-room, boiler-room, and coal-shed	1,050	*1,050	*1,050
13. Disinfecting chamber, incinerator ... ..	500	500	500
14. Engineer's and smith's workshops ... ..	150	150	150
15. Morgue, and <i>post-mortem</i> rooms ... ..	400	*400	*400
16. Building for patients' disinfected clothes ... ..	200	150	150
17. Engineer's quarters ... ..	250	250	200
18. Four ambulance-sheds, five-stalled stable, harness-room, fodder and litter rooms ... ..	400	*350	*350
19. Building for general coal-store and gardener's tool-shed, &c. ...	150	100	100
20. Building to serve as receiving-room, and another as discharging-room, with baths ... ..	550	500	†250
21. Four large one-floored brick pavilions, each for 24 beds, with detached ward offices with day-room, separation-room, nurse's room, &c., each £3,968 ... ..	15,872	*15,872	*15,872
22. Two large two-floored brick pavilions, four wards, £14,050 ...	...	...	...
23. Four small brick wards, each for four beds ... ..	2,350	*2,350	*2,350
24. Four large one-floored wooden pavilions, each for 24 beds, each £2,440 ... ..	...	...	...
25. Quarters for matron, and nursing and domestic staff—80 rooms	8,000	6,000	‡3,000
26. Bathhouse, twelve baths, changing-rooms, and 140 lockers for matron and nurses ... ..	700	600	‡350
27. Sitting and reading rooms for nurses ... ..	450	350	...
28. Pnerperal fever ward (three beds) ... ..	682	*682	...
29. Erysipelas ward (three beds) ... ..	762	*762	...
30. Leprosy ward (three beds) ... ..	762	*762	...
31. Laying and fixing water and gas pipes and fittings ... ..	1,200	1,200	800
32. Laying hot-water pipes and appliances ... ..	800	800	600
33. Furniture for patients and for staff ... ..	4,000	4,000	3,000
34. Fencing, drainage, forming and paving roads and footpaths ...	850	850	850
Add 10 per cent. for contingencies ... ..	53,773 5,377	47,503 4,750	36,847 3,684
Total ... ..	59,150	52,253	40,531

\* Brick.

† Only one room.

‡ Half staff.

S. K. LE CAPELAIN, C.E.,

8th December, 1891.

Engineering Inspector.

## APPENDIX B.

MEMORANDUM BY DR. GRESSWELL ON A SMALL ISOLATION-HOSPITAL  
FOR THE METROPOLIS.

The members of the conference, delegated by different metropolitan municipal councils to inquire into the necessity for and the expense of establishing and maintaining a hospital for isolation and for treatment of persons suffering from infectious disease, applied some time ago to the Board for information as to the plans of the buildings which would best serve this purpose—the hospital to be of iron, to accommodate two different infections, and to comprise four wards for 20 beds or four wards for 40 beds—and as to the expense of erecting the same. On these questions I now have to report as follows.

It will be best, I think, in making this provision to plan the buildings in such a manner that, if it be decided afterwards to add to the accommodation, the buildings first erected will satisfactorily fall in with all the arrangements of a more extensive institution. To this end, I sketched a rough plan for a hospital on the lower scale suggested by the conference, though capable, it should be stated, of accommodating four more (24 instead of 20) than the number of patients proposed by that body. This plan I submitted to Mr. Bastow, the Government Architect, and he has kindly had it sketched to scale, and the cost of erecting it estimated.

In this plan\* there are two main ward-buildings (one on either side of certain administration buildings); and, in the front, the doctor's quarters, the receiving-room, and the nurses' quarters. Each ward-building is divided into male and female portions by two small compartments to be used as ward-kitchen and nurse's duty-room; and each such portion is capable of accommodating six persons.

If accommodation should be required for 40 instead of 24 patients, each ward would need to be enlarged by adding proportionately to its length.

Should it be determined at a later date to provide still more accommodation, a ward-building similar to those in the plan could be added to the right and left; and, if at such date the accommodation should still be devoted to only two infectious diseases, the dividing compartments in each ward-building could be removed (the two wards thus formed on the one side of the administration buildings being devoted to males and females suffering from one infectious disease, and the two wards on the other side to males and females suffering from the other of the two infectious diseases)—the closet and lavatory at one end of each being removed, and rooms (office block) for the nurse, kitchen work, and so on being constructed as an annex to that end of the building.

It will thus be seen that, though the plan will provide for the requirements on the lower scale suggested by the Conference, it will admit of indefinite extension, and in a manner complying at all points with modern hospital hygiene.

Turning now to the expense of building these structures in accordance with the plans appended, Mr. Bastow finds that with buildings of iron, or of iron and weatherboards, or of iron and internal lining of plaster rendered in cement on expanded metal lathing, the total cost for 20 beds would be £4,220, or for 40 beds, £5,245; and that with buildings of brick for 20 beds the total cost would be £5,400, and for 40 beds, £6,685. These estimates do not include architect's fees, and make no allowance for contingencies.

The details of cost are given by Mr. Bastow as under :—

A.—Wards for twenty patients and constructed of wood framing, and (1) covered outside with iron and lined on walls and ceiling inside with Italian corrugated iron, the iron being painted outside and distempered inside; or (2) if similarly constructed, but with weatherboards outside instead of iron; or (3) if similarly constructed, but lined inside by plaster with a cement face on expanded metal lathing							£1,600
Constructed similarly to the wards—							
Doctor's quarters and receiving and discharging room	...	...	...	...	...	...	500
Two nurses' rooms	...	...	...	...	...	...	280
Two storemen's and cooks' quarters	...	...	...	...	...	...	320
Storeroom and dispensary	...	...	...	...	...	...	100
Kitchen and scullery	...	...	...	...	...	...	120
Washhouse	...	...	...	...	...	...	100
Disinfecting house, with hot chamber	...	...	...	...	...	...	125
Mortuary	...	...	...	...	...	...	75
Grading and asphaltting under sites of buildings	...	...	...	...	...	...	100
Simple covered ways to connect the buildings	...	...	...	...	...	...	150
Fencing and gates for site of, say, 5 acres (H.W. pickets)	...	...	...	...	...	...	200
Furniture, including floor covering where necessary	...	...	...	...	...	...	450
Drainage and water supply, say	...	...	...	...	...	...	100
							£4,220
B.—Wards for 40 patients, and constructed as described under A, the kitchen, scullery, and washhouse proportionately enlarged, and all other buildings constructed as under A							£4,170
Simple covered ways to connect the buildings	...	...	...	...	...	...	150
Fencing, gates, furniture, drainage, and water supply	...	...	...	...	...	...	925
							£5,245

\* For a more complete description of the plan reference may be made to my Report on the Charitable Institutions of Melbourne.

C.—Wards for twenty patients, and all other buildings mentioned under A, constructed					
of brick (inclusive of covered ways)	...	...	...	...	£4,650
Fencing, gates, furniture, drainage, and water supply	...	...	...	...	750
					<hr/> £5,400
D.—Wards for 40 patients, and all other buildings mentioned under A, constructed					
of brick—the wards, kitchen, scullery, and washhouse being proportionately					
enlarged, together with covered ways	...	...	...	...	£5,760
Fencing, gates, furniture, drainage, and water supply	...	...	...	...	925
					<hr/> £6,685

No doubt some of the items provided for in the above estimates could, for a time, be dispensed with—*e.g.*, the receiving-room, parts of the nurses', cooks', and storemen's quarters, portion of the covered ways, and of the fencing; so that £500 might probably be deducted from each of the above estimates. On the other hand, it is to be borne in mind that the structures, estimates of the cost of which have been given above, are of the most simple description; that contingencies need to be allowed for; and that, unless the planning and building be under Governmental supervision, there are architects' fees to be added.

Concerning the cost of maintenance, I have made inquiry of Mr. Norman, Secretary to the Alfred Hospital, and am informed that twenty shillings as an average would probably cover the cost per week for one patient, *i.e.*, £52 per year, or £1,040 for twenty beds continuously occupied for one year.

D. ASTLEY GRESSWELL, M.A., M.D., Oxon.

12th September, 1893.



